

**2nd Six Weeks – Week 2.6****FOUNDATIONS OF FUNCTIONS UNIT VOCABULARY**

x-axis	horizontal	input	domain	dependent
y-axis	vertical	output	range	independent
pattern	relationship	rule	function	correlation
rate	rate of change	slope	variation	variable
positive	negative	increasing	decreasing	constant
quadrants	scatterplot	coordinate	plane	no relationship
intercept	intersection	solution	continuous	discrete
point	origin	(x , y)	ordered pair	coordinates

**TAKS VOCABULARY REVIEW**

scale	proportion	ratio	percent	unit rate
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**MATERIALS**

Cornell notes	graphing calculators	manipulatives	hexagon shapes
textbook	D2SC Patterns WS/PPTs	laptop computer	

**AVID and ESL Strategies**

Think-Pair-Share	4 Corners	Expert/Consultant
Carousel	KWL	Frayer/Venn diagrams
Quick Write	Quick Work	Marzano's 6 Steps - Vocabulary

**TECHNOLOGY**

**Reminder:** Students will bring laptops to class.

Gizmos	On-line TEKS Related Games (Archimedes)
Interventions	Assessments

**SPIRALING & TAKS**

Equations, proportions, ratios and percents through warm-ups.

**4<sup>th</sup> PERIOD**(as time allows in other periods)

Create Word Walls; Graph Bingo; Mosaics and/or Matchstick Patterns, Archimedes.

**Monday, November 9, 2009****Patterns and Sequences: Hexagon Train (Hylemon)**  
**TEKS A.3B, A.5A****Warm-Up:** TAKS prep

**Engage:** To help make this topic a smooth transition from the previous topic, open the lesson with a very simple data collection activity that demonstrates a perfect, linear correlation. Ask students to plot the data so that they can see the direct relationship, and then try to find the  $n$ th term. (Data source: teacher's discretion)

**Objective:** The student will find the pattern of a sequence and determine the next few terms. The student will find the  $n$ th term of a sequence in order to make conjectures about the data. The student will analyze diagrams/pictures and determine a pattern.

**Explore:** Students will physically build hexagon trains from the hexagon blocks; from the experience the students will determine the pattern, relate the pattern to rate of change in the 3 process table, graph their results and write an equation representing the data.

**Explain:** Discovery task for the students; no explanation. The teacher will use the Socratic Method to draw out conclusions and their applications from the students.

**Elaborate:** N/A

**Evaluate:** Students will create posters of their findings, including their multiple representations.

**Tuesday, November 9, 2009**

Patterns and Sequences Hexagon Train (continued) and Mosaics  
TEKS A.3B, A.5A

**Warm-Up:** TAKS prep

**Engage:** To help make this topic a smooth transition from the previous topic, open the lesson with a data collection activity that demonstrates a perfect, linear correlation. Ask students to plot the data so that they can see the direct relationship, and then try to find the  $n$ th term.

**Objective:** The student will find the pattern of a sequence and determine the next few terms. The student will find the  $n$ th term of a sequence in order to make conjectures about the data. The student will analyze diagrams/pictures and determine a pattern.

**Explore:** Students will finish the hexagon train project from yesterday and present their method of calculating the perimeter.

Students will explore the same concept with 'Tile Archimedes' Bath' online, <http://www.mathsonline.co.uk/nonmembers/resource/algebra/tiles1.html>.

From the online experience the students will determine the pattern, relate the pattern to rate of change in the 3 process table, graph their results and write an equation representing the data.

**Explain:** Discovery task for the students; no explanation. The teacher will use the Socratic Method to draw out conclusions and their applications from the students.

**Elaborate:** Think-Pair-Share: Students are given a number of variances on the hexagon train problem to work on in pairs (for example triangular or octagonal shapes.) Individually, the students will compare and contrast the results with those changes. The students work the same problems for a few minutes and then compare their work with that of their classmates.

**Evaluate:** Students will create posters of their findings, including their multiple representations.

**Wednesday, November 10, 2009**

## Unit Rates, Constant Rates of Change and Application

**Warm-up:** TAKS prep

**Engage:** Think-Pair-Share – Individually the students will come up with 3 rates of change from their own life; listen to their partners ideas; share their ideas with their partner.

**Objective:** Students will be able to determine constant rates of change; solve problems involving constant rates of change; interpret graphs of functions in real world. Students will use their knowledge of patterns to determine the rate of change and relate 'rate of change' to the term 'slope.'

**Explore:** Rediscover the relationship between vocabulary and algebraic expressions by writing equations for their own ideas derived during Think-Pair-Share activity.

**Explain:** Teacher will explain how the commonly used unit rates are constant rates of change, contrast with constant rates of change other than unit rates.

**Elaborate:** N/A

**Evaluate:** After working problems individually, students will collaborate with their partner to evaluate accuracy. Teacher will direct class discussion to assess and guide correct understanding. D2SC 'Slope as Rate of Change.'

**Monday, November 16, 2009**

Opportunity to improve Test scores  
**Domain/Range; Independent/Dependent Variables; Identifying Functions  
from Ordered Pairs, Mapping Diagrams, Tables, Graphs and Functions**  
**TEKS: 1.A, 1.B, 1.C, 1.D, 1.E2.B, 2.C, 3.A, 3.B, 4.A, 4.B**

**Warm-Up:** N/A

**Engage:** N/A

**Objective:**

Retest: Students will be able to successfully identify domain/range, independent/dependent variables, and functions from ordered pairs, mapping diagrams, tables, graphs and functions.

**Explore:** N/A

**Explain:** N/A

**Elaborate:** N/A

**Evaluate:** Students will retake any of the three tests from this six weeks for which they wish to improve their scores.

**Friday, November 12, 2009**Constant Rate of Change  
TEKS A.6.A**Warm-Up:** TAKS prep**Engage:** Archimedes Teacher Demonstration<http://www.mathsonline.co.uk/nonmembers/gamesroom/sims/archi/archi4.html>

**Objective:** Students will connect input, domain, and the independent variable with the x value; students will connect output, range and the dependent variable with the y value. Students will use their knowledge of patterns to determine the rate of change and relate 'rate of change' to the term 'slope.'

**Explore:** Archimedes Student Activity<http://www.mathsonline.co.uk/nonmembers/gamesroom/sims/archi/archi4.html>

**Elaborate:** Teacher will use Socratic Method as students explore the functions related to Archimedes to draw out the implications.

**Explain:** Teacher will demonstrate the application of concepts learned through the Archimedes Activity by working examples from the 'What's My Rule Topic 6-2' with the class.

**Evaluate:** Students will complete 'What's My Rule WS;' odd numbers classwork, even numbers homework. Teacher will use small groups and/or walk around the room to informally assess understanding and explain as needed.

**Monday, November 16, 2009****Parent Functions****Domain/Range; Independent/Dependent Variables; Identifying Functions from Ordered Pairs, Mapping Diagrams, Tables, Graphs and Functions****TEKS: 1.A, 1.B, 1.C, 1.D, 1.E2.B, 2.C, 3.A, 3.B, 4.A, 4.B****Warm-Up:** TAKS prep**Engage:** Students N/A**Objective:**

Parent Functions: The student will graph and identify various parent functions. The student will recognize  $y = x$  as the linear function,  $y = x^2$  as the quadratic function and predict the changes in the graph given various changes to the parent equation. The student will learn the names of the different parent functions along with the meaning of "parent" as used in mathematics. The major parent functions in algebra I include (but not limited to) linear, quadratic, exponential and cubic.

Retest: Students will be able to successfully identify domain/range, independent/dependent variables, and functions from ordered pairs, mapping diagrams, tables, graphs and functions.

**Explore:** One at a time, give the students 3 parent functions to graph on their calculator ( $y=x$ ,  $y=x^2$ ,  $y=x^3$ .) Ask the students to describe which function goes with which graph. Have the students graph  $y=2x^2$ , and  $y=x^2+3$ , ask them to guess which of the parent functions is the parent to these 2 graphs. Continue in the same way for the remaining parent functions (out of order).

**Explain:** Discuss linear versus quadratic functions.

**Elaborate:** N/A

**Evaluate:** Teacher will monitor and check for understanding by informally assessing during the class period.